What is claimed that:

1. A thermistor device comprising a first layer comprised of a first substance having a positive or negative temperature coefficient of resistance and a second layer comprised of a second substance having conductivity or semiconductivity and located directly on the first layer.

2. The device according to Claim 1, wherein said first substance is a substance having a positive temperature coefficient of resistance and having 100 mΩcm or less at operating temperature or lower.

3. A thermistor device comprising a first layer comprised of a first substance having a positive temperature coefficient of resistance and a second layer comprised of a second substance having semiconductivity and formed directly on the first layer, wherein the interface between the first and second layers changes to a pn junction, as the first substance changes from being conductive to semiconductive or insulative at or near the transition temperature T_{M-I}.

4. A thermistor device comprising a first layer comprised of a first substance having a positive temperature coefficient of resistance and a second layer comprised of a second substance having conductivity and located directly on the first layer, wherein the interface between the first and second layers changes to a schottky barrier, as the first substance changes from being conductive to semiconductive or insulative at or near the transition temperature T_{M-I}.

5. The device according to any one of Claims 1 to 4, wherein said first substance is selected from substances which belong to the strongly correlated electron systems.

6. The device according to any one of Claims 1 to 4, wherein said first substance is selected from the group consisting of vanadium oxides $(V_{(1-x)}M_x)_2O_3$ (M represents Cr or Ti, $0 \leq x \leq 0.2$), $NiS_{(2-y)}Se_y$ ($0.5 \leq y \leq 1.67$), bisethylenedithio-tetrathiafluvalene (hereinafter, abbreviated as "BEDT-TTF" in some cases) salts and manganese oxides $(M'_{(1-z)}M''_z)MnO_3$ (M' represents an alkaline earth element, M" represents a rare earth element, $0 \leq z \leq 0.6$).

7. The device according to any one of Claims 1 to 6, wherein said first substance is a vanadium oxide $(V_{(1-x)}M_x)_2O_3$ (M represents Cr or Ti, $0 \leq x \leq 0.2$).

8. The device according to any one of Claims 1 to 7, wherein said second substance is selected from the group consisting of n-type semiconductive oxides, p type semiconductive oxides and p- or n-type single element semiconductors.

9. The device according to any one of Claims 1 to 8, wherein said second layer has a thickness of 1000 nm or less.

10. A thermistor apparatus comprising a thermistor device and a voltage control means for controlling an applied voltage to the thermistor device, wherein said thermistor device comprises a first layer comprised of a first substance having a positive temperature coefficient of resistance and a second layer comprised of a second substance having conductivity or semiconductivity and located directly on the first layer.

11. A thermistor apparatus comprising a thermistor device

and a voltage control means for controlling an applied voltage to the thermistor device, wherein said thermistor device comprises a first layer comprised of a first substance having a positive temperature coefficient of resistance and a second layer comprised of a second substance having semiconductivity and located directly on the first layer, and the interface between the first and second layers changes to a pn barrier or a schottky barrier, as the first substance changes from being conductive to semiconductive or insulative at or near the transition temperature T_{M-I}.

12. A thermistor apparatus comprising a thermistor device and a voltage control means for controlling an applied voltage to the thermistor device, wherein said thermistor device comprises a first layer comprised of a first substance having a positive temperature coefficient of resistance and a second layer comprised of a second substance having conductivity and located directly on the first layer, and the interface between the first and second layers changes to a pn junction or a schottky barrier as the first substance changes from being conductive to semiconductive or insulative at or near the transition temperature T_{M-I}.

Abstract of the Invention

A thermistor device having a high-speed response to temperature and a large ON/OFF ratio at the operating temperature. The thermistor device compirises a first layer of a first metarial having a positive temperature coefficient of resistance and a second layer of a second material having a semiconductivity and formed directly on the first layer. As the first material changes from conductive to a semiconductive or an insulative at or near the transition temperature T_{M-I}, the interface between the first and second layer changes to a pn junction.